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Invited lecture

AB INITIO CALCULATIONS OF STARK BROADENING PARAMETERS

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We need energy levels and oscillator strengths for calculating Stark broadening parameters. Generally we use recent theoretical or experimental data; we can also use one of the atomic databases as NIST or TOPBase.

For some emitters there is a big discrepancy between the different atomic data from different sources which influence the Stark broadening results.

In a recent paper (Hamdi et al., 2007) have been calculated ab initio impact line widths and shift for 26 Ne V multiplets using SUPERSTRUCTURE code for energy levels and oscillator strengths and the semiclassical approach for the Stark parameters.

In an other recent work, (Milovanović and Dimitrijević, 2007) have been calculated ab initio Stark broadening parameters of 5 multiplets of S II, 3 multiplets of S III and 2 spectral lines of S IV using Cowan code for the atomic data (energy levels) needed and the modified semi-empirical approach (MSE) for the width calculations. Results are compared with those calculated using energy levels taken from NIST atomic spectra database.

The ab initio methods are interesting because they do not need any additional data; the atomic data necessary to the Stark broadening parameters (energy levels and oscillator strengths) are calculated using SUPERSTRUCTURE or Cowan codes or any other atomic packages.

References

Hamdi, R., Ben Nessib, N., Dimitrijević, M. S., Sahal-Bréchot, S.: 2007, *ApJS*, **170**, 243.

Milovanović, N., Dimitrijević, M. S.: 2007, *AIP Conf. Proc.*, **938**, 858.